CONCEPTS OF NUMBER

<u>WHAT IS NUMBER</u>; Yet a satisfactory answer to what a number is ,was attained only in 1884 A.D. Gottlob Fregé .The concept of number is the most basic and fundamental in the world of science and mathematics .

A number is the mathematical objects use to count ,measure and label.

<u>CLASSIFICATION</u>: Main types of number are

i) Natural Number
ii) Integers
iii) Rational Number
iv) Irrational Number
v) Real Number
vi) Complex Number

** *Numbers* are the distinguished form of *NUMERALS.*

NUMERALS:

The symbol use to represent numbers was called NUMERAL . Egyptions invented the first ciphered Numeral system.

____________*NATURAL NUMBER* ***(N)***

The counting numbers {1,2,3…..} are commonly called NATURAL NUMBERS. However the non-negative integers without 0 are called NATURAL NUMBERS.

There are two types of natural numbers:

A) PRIME NUMBERS

Numbers that are divide by 1 and that number only.

B)COMPOSITE NUMBER

Numbers that are divided by 1 , that number and other number or numbers.

PROPERTIES:

Natural Numbers are closed under addition and multiplication.

(2+3)=5[***N*]*.*** (2 * 3)=6[***N***]

They are not closed under subtraction and division.

(3%2)=1.5[not natural]. (2-3)=-1[not natural]

INTEGER(***Z***)

MEANING:

Z(Zahlen) is used to denote the set of all INTEGERS.Integer means *WHOLE* .

DEFINATION:

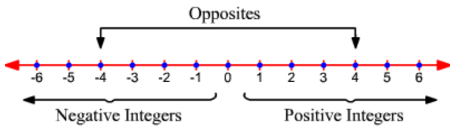
Number that can be written without fractional component is called INTEGERS.

The set of all positive and negative Real Numbers including 0 ,are called INTEGERS,

There are two types of integers generally

A) Positive Integers (1,2,3,0,….)

B) Negative Integers(-1,-2,-3,-4,….)



[0 is a positive integer]

ADDITION	**SUBTRACTION**
Same Sign 1. Add the numbers. 2. Copy the sign. **Different Signs** 1. Subtract the numbers. 2. Copy the sign of the larger number.	1. Change the sign of the subtrahend. 2. Use the addition rule for integers.
MULTIPLICATION	**DIVISION**
Same Sign - Product is positive **Different Signs** - Product is negative	**Same Sign** - Quotient is positive **Different Signs** - Quotient is negative

RATIONAL NUMBER(Q)

A Rational is any number that can be expressed as the fraction P/Q .Where P,Q are the integers but Q is not zero.

Because ,if Q =0 , P= a and P/Q=b

a/0=b
=>a=0*b
=>a=0
Then for all Q=0 ,P=0

0/0 implies any rational number, then it is undefined.
So Q does not 0.

EXAMPLES:

2/3,1/5,4,0

PROPERTIES:

There are some properties of Rational Numbers ,like closure pro ,commutative pro and associative pro.
Rational Numbers are closed under addition ,subtraction and multiplication but division does not satisfy closure property

1/5+2/5=3/5[**Q]**

7/4-1/4=3/2[**Q**]

3/2*4/5=6/5[**Q**]

2/5%2/5=1[**Q**]

But 2/5%0 Undefined

So division is not closer for **Q.**

IRRATIONAL NUMBER

An Irrational Number can not be expressed as a ratio between two numbers and it can not be written as a simple fraction because there is not a finite number of numbers when written as a decimal .Instead the would go on forever without ***repeating.***

MEANING:

Irrational Number means a number which is not Rational .

EXAMPLES:

pi,

PROPERTIES :

An Irrational Number is a real number that can not be written as a simple fraction .

REAL NUMBER ***(R)***

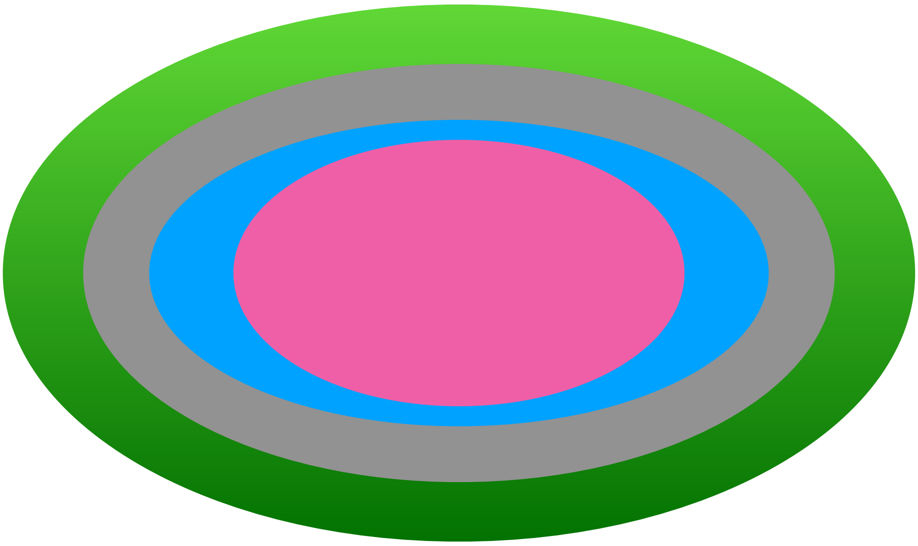
The type of number we normally use such as 1,12,12.23,-3,-.4,3/4 etc.
Positive or negative ,large or small ,whole numbers or decimal numbers are all real number.A real number is a value that represent a quantity along a continuous number line .Real Numbers can be ordered.

MEANING:

They are called real number because they are not imaginary number.They show the value of some thing real.
In mathematics we like our numbers pure ,when we write 0.5 we mean exactly half .But in real half may not be exact(cutting a stick exactly in half).

REAL NUMBER INCLUDED:

A)whole numbers (like 0,3,23,-8,…)



B)Rational Number (2/3,3/4,.124,…)
C)Irrational Numbers (pi,2^1/2,3^.5)

REAL NUMBER DOES NOT INCLUDED:

A)Imaginary Number [-1^1/2]
B)Infinity.

PROPERTIES

Real Numbers hold many properties such as

(i)commutative[a+b=b+a][ab=ba]
(ii)Associative [(a+b)+c=a+(b+c)][(ab)c=a(bc)]
(iii)Distributive [a(b+c)=ab+ac]
And so on.

Rational vs Irrational

1.5=3/2 Ratio

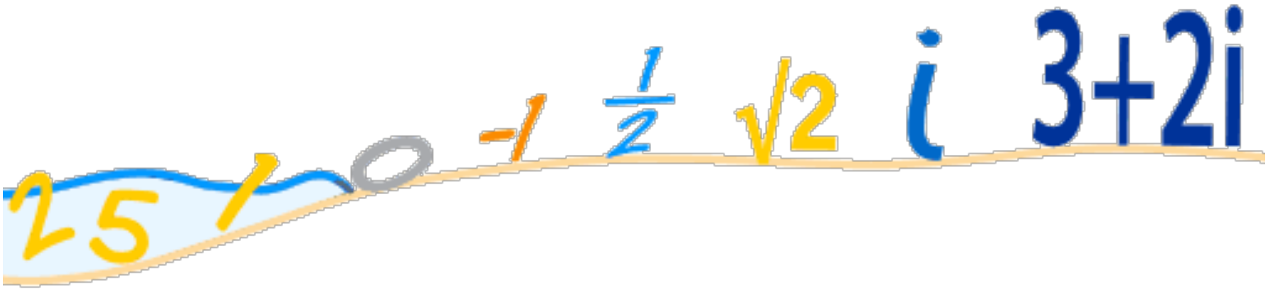
π = 3.14159... = ? (No Ratio)

Rational

Irrational

*** Real Numbers are closed under addition and multiplication.

The Evolution of Numbers



COMPLEX NUMBER

A complex number is a number that can be expressed as a from of a+ib where a and b are real numbers and (i) is the imaginary unit , satisfying the equation i^2 =-1.In this expression a is called the real part and b is the imaginary part of the complex number.

$$7 + 3i$$

Real Imaginary

EXAMPLES:

Real numbers are numbers like 1,12.38,-0.8675,3/4
And imaginary numbers are like 2i,-5i,0.2i etc.

IMAGINARY NUMBERS:

If Square of a number gives negative result, then it is called Imaginary Number.

Exp;
(i), (-i) , π i ,ei

MEANING:

Complex number does not mean complicated.It means the two types of number, real and imaginary together form a complex.

N.B.

A complex number is a combination of a real number and imaginary number.But either one part can be zero, so all real numbers and imaginary numbers are also complex numbers.

INFINITY

What is Infinity?

Infinity is the idea of something that has no end.
In our world we don't have anything like it. So we imagine traveling on and on, trying hard to get there, but that is not actually infinity.
So don't think like that (it just hurts your brain!). Just think "endless", or "boundless".
If there is no reason something should stop, then it is infinite.

Infinity is not a real number

Infinity is not a real number, it is an idea. An idea of something without an end.
Infinity cannot be measured.
Even these faraway galaxies can't compete with infinity.

Infinity does not grow

Infinity is not "getting larger", it is already fully formed.
Sometimes people (including me) say it "goes on and on" which sounds like it is growing somehow. But infinity does not **do** anything, it just **is**.

Definition of zero: the arithmetical symbol 0 or Ø denoting the absence of all magnitude or quantity .

First Known Use of zero

1810

CONCEPT:An independent value midway between +1 and -1.Various denotative or connotative meanings for zero include "total failure," "absence," "nil," and "absolutely nothing." ("Nothing" is an even more abstract concept than "zero" and their meanings sometimes intersect.)

END

CONCEPTS OF NUMBERS

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